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## Teratoma Generation in the Testis Capsule.

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### Public Summary:

This is a Journal of Visualized Experiments (JoVE) article that illustrates methods for generating teratomas from human pluripotent stem cells in immunodeficient mice. This method allows us to examine and characterize a wide variety of tissues formed from human cells. In general the human cells form more mature cell types in teratomas than they do in culture dishes, which enables more extensive analysis of human development. The video component of this article can be found at <http://www.jove.com/video/3177/>

### Scientific Abstract:

Pluripotent stem cells (PSCs) have the unique characteristic that they can differentiate into cells from all three germ layers. This makes them a potentially valuable tool for the treatment of many different diseases. With the advent of induced pluripotent stem cells (iPSCs) and continuing research with human embryonic stem cells (hESCs) there is a need for assays that can demonstrate that a particular cell line is pluripotent. Germline transmission has been the gold standard for demonstrating the pluripotency of mouse embryonic stem cell (mESC) lines(1,2,3). Using this assay, researchers can show that a mESC line can make all cell types in the embryo including germ cells(4). With the generation of human ESC lines(5,6), the appropriate assay to prove pluripotency of these cells was unclear since human ESCs cannot be tested for germline transmission. As a surrogate, the teratoma assay is currently used to demonstrate the pluripotency of human pluripotent stem cells (hPSCs)(7,8,9). Though this assay has recently come under scrutiny and new technologies are being actively explored, the teratoma assay is the current gold standard(7). In this assay, the cells in question are injected into an immune compromised mouse. If the cells are pluripotent, a teratoma will eventually develop and sections of the tumor will show tissues from all 3 germ layers(10). In the teratoma assay, hPSCs can be injected into different areas of the mouse. The most common injection sites include the testis capsule, the kidney capsule, the liver; or into the leg either subcutaneously or intramuscularly(11). Here we describe a robust protocol for the generation of teratomas from hPSCs using the testis capsule as the site for tumor growth.

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